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(54) DIAPHRAGM SPRING CLUTCH

(71) We, FICHTEL & SACHS AG., a German Body Corporate, of 62 Ernst-Sachs-Strasse, Schweinfurt am Main, Germany, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:-

This invention relates to a diaphragm spring clutch with reinforcement of the points of support between a diaphragm spring, on the one hand, and a clutch housing and/or pressure plate, on the other hand.

It is known, for example, from German utility patent No. 1984450 to insert in clutches with aluminium housing, wearresistant reinforcements in the form of steel wire rings between the diaphragm spring and the housing. This kind of protection against wear and tear, is expensive and the fastening of the reinforcements is not without problems.

The present invention therefore enables protection against wear and tear for diaphragm or plate springs which is simple to produce, simple to instal and which functions perfectly.

According to the present invention there is provided a diaphragm spring clutch with reinforcement of the points of support between a diaphragm spring, on the one hand, and a clutch housing and/or pressure plate, on the other hand the said reinforcement comprising supporting elements mounted on said clutch housing and/or said pressure plate respectively, said supporting elements being distributed around the periphery of said clutch housing and/or said pressure plate respectively, said supporting elements having punctiform contact with said diaphragm spring, said support elements having their support faces made of a material having increased strength as compared with the material of the clutch housing and/or the pressure plate respectively.

This version is characterized by a particularly precise abutment of the diaphragm spring at the individual points of support.

A particularly inexpensive version can be achieved by designing the supporting elements as balls or cylindrical pins with convex end faces.

A further preferred feature of the invention consists in that the diaphragm spring is provided at the points of contact with recesses, the radius of which is greater than that of the end faces of the supporting elements. This results in a centering effect on the diaphragm spring, on the one hand, and in a reduction of the contact pressure at the points of contact, on the other hand.

The invention will now be explained below in greater detail with reference to the embodiments illustrated by way of example in the drawings wherein

Fig. 1 shows a longitudinal section through the lower half of a diaphragm spring clutch with balls inserted in the pressure plate;

Fig. 2 shows a part of the arrangement of Fig. 1 with inserted cylindrical pins;

Fig. 3 shows an enlarged view of a point of support with recesses in the diaphragm spring;

Fig. 4 shows the arrangement of cylindrical pins in the clutch housing.

The section through the lower half of a diaphragm spring clutch shown in Fig. 1 illustrates a clutch housing 2 to which a pressure plate 1 is connected rotation-fast but displaceable in the axial direction. A diaphragm spring 3 is arranged between the clutch housing 2 and the pressure plate 1. The diaphragm spring 3 is prestressed in the axial direction and abuts against the clutch housing via an annular projection 8 and against the pressure plate 1 via several balls 4 which are hardened and are distributed over the periphery of the pressure plate. A support ring 6 is moreover arranged on the side of the diaphragm spring opposite the projection 8 and abuts in its turn against rivets 9 in the clutch housing 2.

Fig. 2 shows the pressure plate 1, the diaphragm spring 3 and one of several cylindrical pins 5 with convex end faces which are dis-

tributed over the periphery of the pressure plate all; unimportant details have been left out

Fig. 3 illustrates a version wherein the diaphragm spring 3 is provided at the point of contact with the cylindrical pins 5 in the pressure plate 1 with a recess 7 the radius R 1 of which is greater than the radius R 2 of the end face of the cylindrical pin 5.

Fig. 4 shows a detail of Fig. 1 representing the area where the diaphragm spring 3 abuts against the clutch housing 2, in this case against offset cylindrical pins 5 with convex end faces which are distributed over the periphery of the clutch housing 2. A support ring 6 is arranged on the side of the diaphragm spring 3 opposite the cylindrical pins 5.

The diaphragm spring clutch according to Figs. 1 to 4 operates as follows:

The diaphragm spring 3 supported between the clutch housing 2 and the pressure plate 1 has the task of clamping the clutch disc (not shown) between the pressure plate 1 and the flywheel (likewise not shown). The contact forces resulting from this support of the diaphragm spring 3 on the housing and the pressure plate, in conjunction with the engagement and disengagement motions, lead to wear and tear at the support points. This wear and tear depends on the contact force and the material used. The wear and tear can be reduced by using the hardened balls 4 or the cylindrical pins 5 with convex end faces which are shown in the figures, even if the basic material used for the clutch housing 2 and/or the pressure plate 1 is not very hard. Moreover the punctiform contact between the diaphragm spring 3, on the one hand, and the housing 2 and/or the pressure plate 1, on the other hand, allows cooling air to pass between the individual balls or pins.

WHAT WE CLAIM IS:-

1. A diaphragm spring clutch with reinforcement of the points of support between a diaphragm spring, on the one hand, and a clutch housing and/or pressure plate, on the other hand, the reinforcement comprising supporting elements mounted on said clutch housing and/or said pressure plate respectively, said supporting elements being distributed around the periphery of said clutch housing and/or said pressure plate respectively, said supporting elements having punctiform contact with said diaphragm spring, said support elements having their support faces made of a material having increased strengths as compared with the material of the clutch housing and/or the pressure plate respectively.

2. A diaphragm spring clutch according to claim 1, wherein the supporting elements are inserted into bores of said clutch housing and/or said pressure plate respectively.

3. A diaphragm spring clutch according to claim 1 or 2, wherein the supporting elements are balls or cylindrical pins with convex support faces.

4. A diaphragm spring clutch according to any one of claims 1 to 3, wherein the diaphragm spring is provided at the points of contact with recesses the radius of which is greater than that of the supporting elements.

5. A clutch substantially as described herein with reference to and as illustrated by the accompanying drawing.

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COMPLETE SPECIFICATION

2 SHEETS

*This drawing is a reproduction of
the Original on a reduced scale
Sheet 1*

Fig. 1

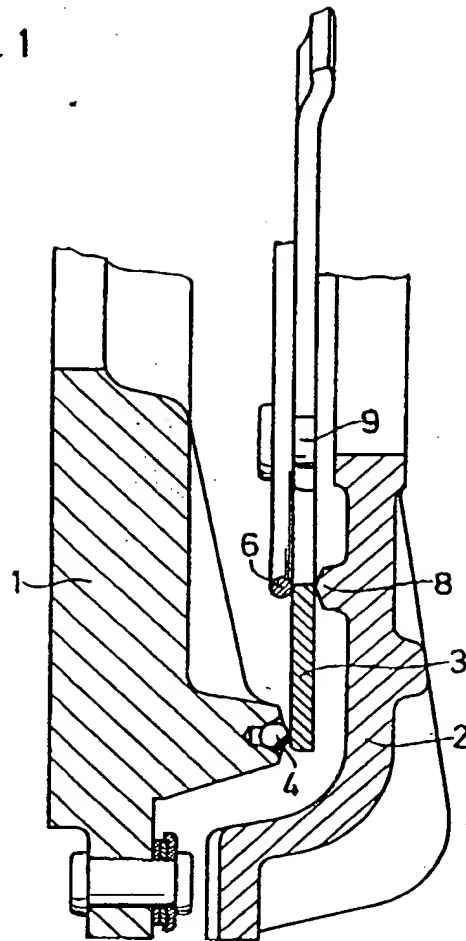


Fig. 2

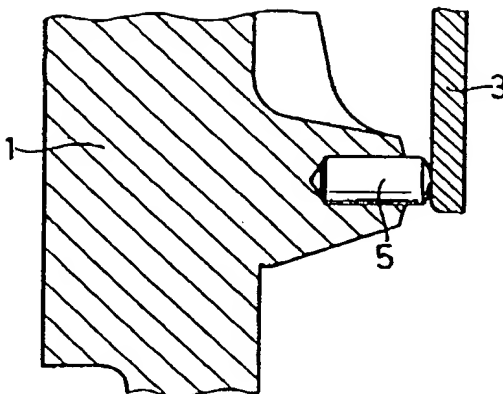


Fig. 3

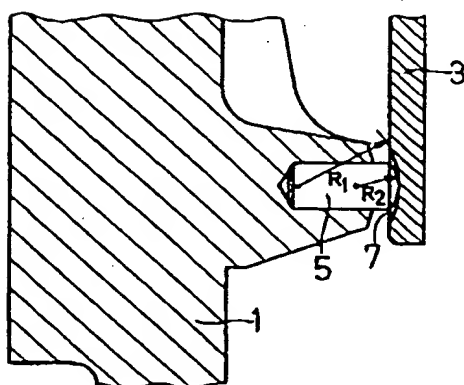


Fig. 4

